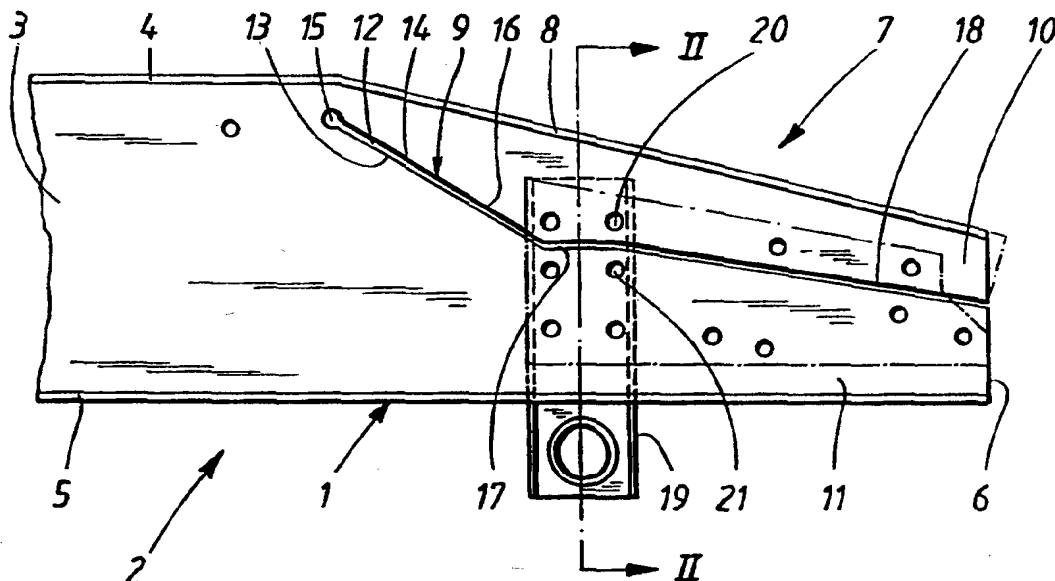


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/SE94/00935</p> <p>(22) International Filing Date: 7 October 1994 (07.10.94)</p> <p>(30) Priority Data: 9303335-5 12 October 1993 (12.10.93) SE</p> <p>(71) Applicant (for all designated States except US): AB VOLVO [SE/SE]; S-405 08 Göteborg (SE).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): NILSSON, Nils [SE/SE]; Arsenalsgatan 10, S-411 20 Göteborg (SE). LEVIN, Göran [SE/SE]; Prilyckegatan 411, S-425 32 Hisings-Kärä (SE).</p> <p>(74) Agents: GRAUDUMS, Valdis et al.; Albihn West AB, P.O. Box 142, S-401 22 Göteborg (SE).</p>	<p>(81) Designated States: JP, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p><b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Swedish).</i></p>	

(54) Title: END SECTION OF FRAME MEMBER



## (57) Abstract

An end section (1) of a frame member (2) in a load-carrying vehicle, wherein the frame member comprises upper and/or lower supporting sections (4, 5) and a connection section (3) extending between said sections (4, 5), which connection section is divided along a section (7) of the end section along a dividing line (9) which extends towards the end (6) of the frame member, the end section presenting a height over said section which decreases in the direction towards the end of the frame member. The end section (1) is kept together by means of at least one plate (19, 24) which spans said dividing line (9) and which is connected with the connection section (3) on both sides of the dividing line by means of screwed or riveted joints.

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5 TITLE:  
End section of frame member.

TECHNICAL FIELD:  
The present invention relates to an end section for a frame  
10 member in accordance with the preamble of appended claim 1.

BACKGROUND OF THE INVENTION:  
With certain types of load-carrying vehicles it is  
advantageous to shape the frame member sections with a  
15 gradually diminishing height. Such load-carrying vehicles  
can for example be semi-trailers in which the coupling  
plate of the trailer unit can slide onto the coupling plate  
of the tractor unit while the front end of the trailer unit  
is lifted. In this regard, for example, a tapered end  
20 section has been formed by welding the upper supporting  
section of the frame member, i.e. its flange, to a web  
section of diminishing height in order to obtain the  
desired inclined surface. Such a specially designed end  
section is thereafter welded to the end of the frame member  
25 of the load-carrying vehicle. Another known solution is to  
use separate sliding plates which are attached to the rear  
end of the frame members by means of screwed or riveted  
joints. A further solution is to obtain the inclining  
surfaces by compression pressing of the ends of the frame  
30 members. All the previously known solutions present the  
disadvantage that they are relatively costly and  
complicated to manufacture.

SUMMARY OF THE INVENTION:  
35 The object of the present invention is to eliminate the  
above-mentioned problems and to provide an end section

which is cost-effective, without diminishing the high demands for strength.

Said object is accomplished by means of an end section according to the characterizing portion of claim 1.

#### BRIEF DESCRIPTION OF THE DRAWINGS:

The invention will be described in the following in connection with an embodiment and with reference to the annexed drawings, in which

Fig. 1 is a broken side view of an end section according to the present invention,

Fig. 2 is a cross-section of the end section along the line II-II in Fig. 1,

Fig. 3 is a perspective exploded view of two end sections, joint together by means of a cross bar,

Fig. 4 shows an end section in a first production stage, and

Fig. 5 shows the end section in a second production stage.

#### PREFERRED EMBODIMENTS:

Figs. 1 and 2 show a broken view and a cross-section, respectively, of an end section 1 of a frame member 2 forming part of a frame construction for a load-carrying vehicle. In the shown example, the frame member 2 is formed as a U-beam with an upright web 3 and an upper laterally directed flange 4 and a lower laterally directed flange 5. The upper, laterally directed, flange 4 may also be regarded as an upper supporting section, whereas the lower flange 5 is a lower supporting section in the sense that they usually form supporting surfaces or bearing surfaces, apart from giving the beam its inherent strength in the form of stiffness etc. The web 3 may be regarded as a connection section between the upper and the lower

supporting sections, though cooperates with these in order to give the beam its total strength properties. Like the remaining portion of the frame member, the end section presents a section of conventional construction with a uniformly U-shaped cross-section, but changes into a section 7 of gradually decreasing height in a direction towards the end 6 of the frame member. The upper supporting section, i.e. the flange 4, forms along this section an inclining plane 8 which can form for example a bearing surface for a coupling plate on a tractor unit of the semi-trailer type so that the coupling plate obtains the desired inclination in order to lift the front end of the corresponding trailer unit during connection.

In accordance with the invention, the connection section 3 is split along the section 7 of diminishing height of the end section 1, along a parting line 9, into an upper portion 10 which is attached to the upper supporting section 8 and an lower portion 11 which is attached to the lower supporting section 5. In practice, the parting line 9 is formed by a gap 12 which is delimited by two edge sections 13, 14 which extend in a parallel manner. The gap 12 starts at a location 15 which is located in the vicinity of the flange 4, i.e. high up in the web 3 in order to extend obliquely along a first section 16 towards the mid portion of the web in a straight line. In the vicinity of the mid portion of the web and in practice slightly higher than an imagined mid line, the gap 12 presents a relatively short horizontal section 17. Thereafter, the gap extends substantially parallel to the inclined plane 8 of the flange 4, along an outer section 18 all the way to the rear end 6 of the frame member. As is apparent, the gap 12 is formed as a hole at the starting point 15, which will be described in greater detail below.

In accordance with the invention, the web of the frame member is kept together in the section 1 of diminishing height by means of a plate 19 which extends parallel to the web 3, preferably in close proximity thereto, and which is connected to the upper and lower sections 10, 11 of the web by means of screws or rivets. For this purpose, the web presents several through holes 20, 21 in said upper and lower sections on the opposite sides of the gap 15, whilst it is ensured that the plate 19 presents holes arranged at corresponding locations so that screws 22 and associated nuts, or alternatively rivets, form a tight connection between the plate and the upper and lower parts of the web, respectively. In Figs. 1 and 2 the described plate 19 is shown attached to the outside of the beam, whereas a second plate 24 is arranged on the inside of the beam and is connected to the web and plate 19 of the beam by means of a common screw/rivet joint. Thus, in this manner, the plate 24 also presents holes at corresponding locations for the insertion of screws/rivets, as well as additional holes, since this plate 24 is larger.

Fig. 3 shows a more complete embodiment of an end section 1 of a frame member design in which the two parallel frame members 2 are mutually connected by means of a cross bar 25 via the above-described internal plate 24 which is also called a junction plate. The cross bar 25 thus presents two junction plates 24, 26, one in each end, which thus have both the function of keeping together the upper and lower sections 10, 11 of the web and also to connect the two end sections 1 via the cross bar 25. In the shown example, the outer plate 19 simultaneously forms an attachment for another component of the vehicle, for example an attachment for a not shown shock absorber or stabilizer.

According to the invention, the section 7 of diminishing height of the end section 1 is produced from a section of

a conventional frame member 2, as is apparent from Fig. 4. Thus, at the outset the original construction of the frame member having a uniform cross-section is used, in which a wedge-shaped recess is cut out so that the two edge sections 14 are formed which meet each other at the inner end 15. The formation of the holes 20, 21 in the web 3, both the holes which are common to the plates 19, 24 as well as additional holes for the wider plate 24, is preferably carried out at this stage, wherein a predetermined orientation in relation to the edge sections 13, 14 is chosen. An outer section 27 is cut obliquely in order to form a straight rear edge in a final state.

By means of clamping means 28, 29 which are applied to the upper and the lower flanges 4, 5, respectively, the section of the flange 4 which is arranged above the cut-out section of the web 3 is bent down, the hole 15 thereby forming a pivot point for the bending movement. By forming the hole and by means of its orientation in the vicinity of the flange 4, a minimum of deformation takes place in the surrounding material and strength in the beam is maintained. The deflection is carried out until the gap 12 obtains an essentially homogeneous width, after which one or both of the two plates 19, 24 are mounted during maintained tension by the clamping means 28, 29. When the clamping force is released, the bent portion has a tendency to spring back, which is absorbed by the screw joint via the plates 19, 24.

The invention is not limited to the embodiment described above and shown in the figures, but may be varied freely within the scope of the appended claims. For example, the beam can have another profile, for example an I-beam, though also a box-shaped beam or a T-beam. Furthermore, the parting line may extend in a different manner than the one shown. It is also possible that only one plate be provided.

## 5 CLAIMS:

1. End section (1) of a frame member (2) in a load-carrying vehicle, wherein the frame member comprises upper and/or lower supporting sections (4, 5) between which a connection  
10 section (3) extends, said connection section being divided throughout a section (7) of the end section along a dividing line (9) which extends towards the end (6) of the frame member, the end section presenting a height along  
15 said section, which height decreases in a direction towards said end of the frame member, c h a r a c t e r i z e d i n that the end section (1) is kept together by means of at least one plate (19, 24) which spans said dividing line (9) and which is connected to the connection section (3) on  
20 both sides of the dividing line by means of screwed or riveted joints.

2. End section according to claim 1, c h a r a c t e -  
r i z e d i n that said dividing line (9) extends from  
25 a point (15) of the connection section (3) in the vicinity of the upper supporting section (4) with an inclination in a direction towards the mid portion of the connection section.

3. End section according to claim 1, c h a r a c t e -  
30 r i z e d i n that said plate (19) forms an attachment plate which is attached to the end of a cross-bar (25).

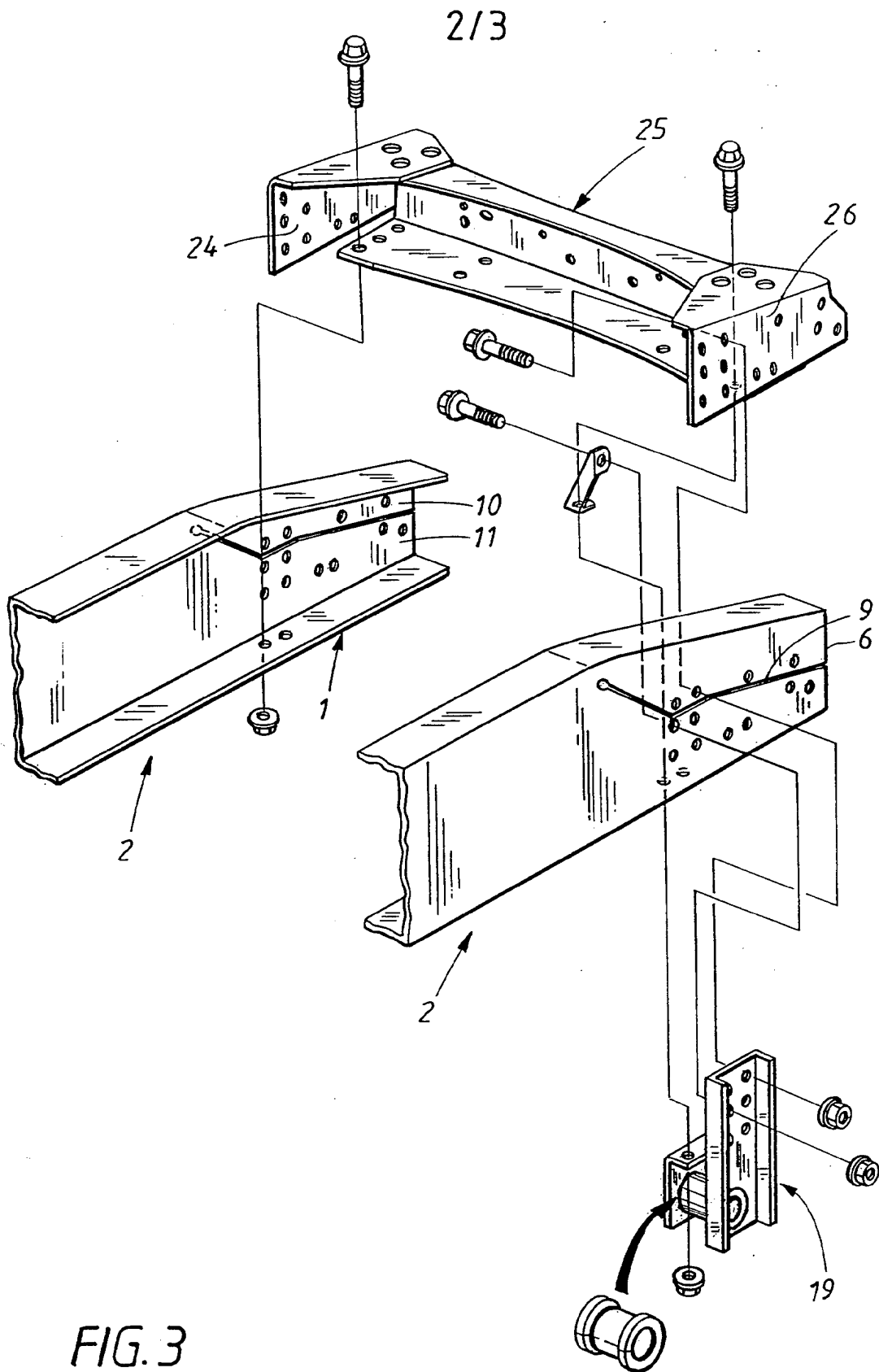
4. End section according to claim 2, c h a r a c t e -  
35 r i z e d i n that the dividing line starts at a hole (15).



5 5. End section according to claim 1, c h a r a c t e -  
r i z e d i n that said decreasing height of said  
section (7) of the end section is obtained by cutting out  
a wedge-shaped section of the connectiong section (3) and  
by bending down the upper supporting section (4) in order  
to allow attachment of the plate (19, 24).

10 6. End section according to claim 1, c h a r a c t e -  
r i z e d i n that a second plate (24) is attached to  
the connection section (3) on the opposite side to the  
first plate.



FIG. 3

3/3

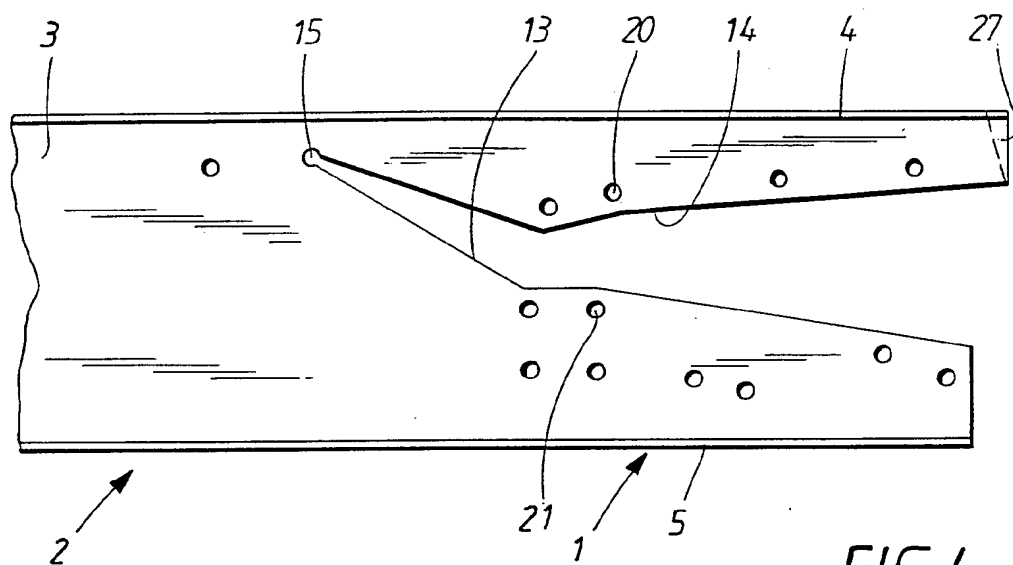


FIG. 4

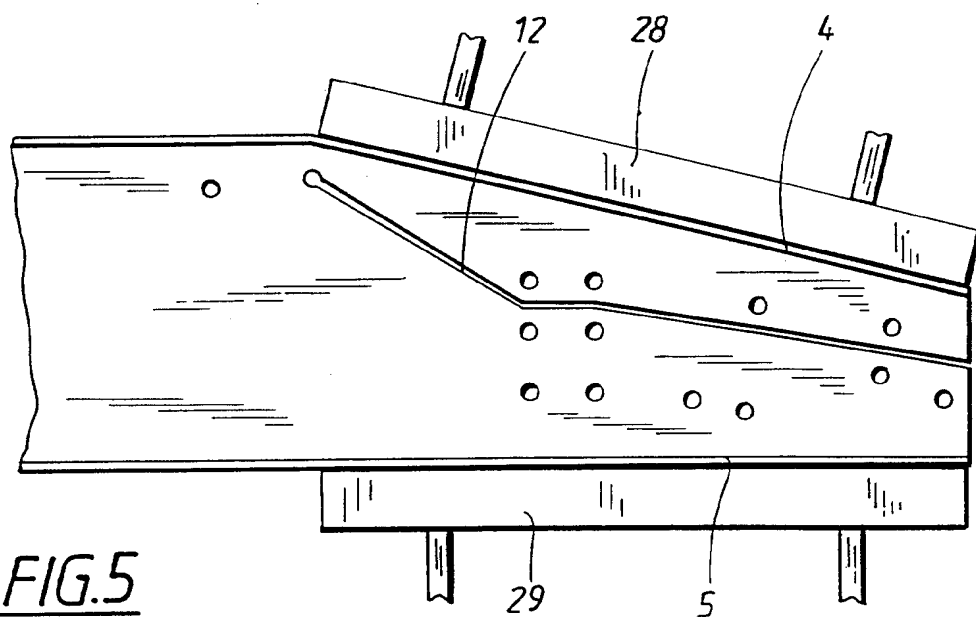


FIG. 5

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 94/00935

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B62D 21/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B62D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB, A, 945649 (RHEINSTAHL HUTTENWERKE), 8 January 1964 (08.01.64), page 2, line 61 - line 65  --	1-6
X	CA, A, 1230357 (LEAR SIEGLER INC.), 15 December 1987 (15.12.87), page 6, line 9 - line 19  --	1-6
A	DE, A1, 2117414 (DAIMLER-BENZ AG), 12 October 1972 (12.10.72), page 3, line 13 - line 20  --	1

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Date of the actual completion of the international search

10 January 1995

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE, B, 1077992 (THEODOR WUPPERMANN), 17 March 1960 (17.03.60)  -- -----	1

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

26/11/94

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A- 945649	08/01/64	DE-B- 1164847 FR-A- 1315569 NL-A- 275060	00/00/00 00/00/00 00/00/00
CA-A- 1230357	15/12/87	US-A- 4576398	18/03/86
DE-A1- 2117414	12/10/72	GB-A- 1337555	14/11/73
DE-B- 1077992	17/03/60	NONE	